REMARKS

Responsive to the aforementioned Office Letter, the applicant has carefully amended this application to overcome each and every objection or rejection advanced by the Examiner.

At the outset, it is to be noted the Claims 12-16 are still incorporated in this application. These claims have been amended to recite those limitations present in Claim 1 which the Examiner contends are directed to a different invention. Therefore, since the operative limitations of Claim 1 are now present in Claims 12-16, it is believed that these claims should be examined with the application as filed.

Claim 29 was deemed to be allowable. However, Claim 29 has been amended only to place the claim in better idiomatic form. Claim 29 as amended does not eliminate any limitations which were present in the previous version of Claim 12 and moreover, does not include any new limitations. It is therefore believed that Claim 29 still remains allowable.

With regard to the rejection of the claims on their merits, the Examiner primarily relied upon the Grosh et al. patent No. 3,357,594. It is respectfully urged that Grosh et al. deals with very different subject matter than that claimed in the instant application. One of the important facets of the present invention is the fact that two shell halves can be abutted together and joined with a simple ring to provide a fluid tight seal there between. It is noteworthy that a pressure vessel of this type can be used in a

space environment and therefore, must be relatively light in weight to be transported to a position in space where it is only subject to the space environment. However, because of the need to propel this tank or pressure vessel to a space environment, weight plays a critical role since it obviously effects the amount of propulsive force needed to place the vessel in a space environment. Consequently, the tank has been designed to take into careful consideration, this need for light weight, but yet still maintain a pressure-tight environment. The design in the Grosh patent admittedly produces a composite pressure vessel. It is joined at the center by an annular ring. However, the ring in Grosh is a metal ring or series of metal plates. When compared to the instant application, the method involved in the production of the load carrying liner is filament over-wound to produce the vessel and then to halves of the vessel are secured together.

There is a serious doubt that any pressure vessel dependent for its structural integrity on a bolted joint would ever be approved by any regulating agency, such as for example, the Department of Transportation, the American Society of Mechanical Engineers, NASA or ISO, etc. The design in the instant application does not suffer the limitation of that suffered by Grosh. The instant design is dependent upon a continuous over-wrapped shell for structural integrity. Grosh does not even come close to providing such a construction. It is to be noted that the claims of the instant application call for the inner and the outer shells, which are mated

together. Such is not the case in Grosh. Moveover, there are not two shell sections, such as two halves, which are abutted together and secured together. With regard to securing the two shell sections, Grosh uses a totally different system than that provided. The metal bolted sections of Grosh are intrinsically inefficient since they utilize pins for transferring axial load. As a result, the joint between the two sections would be heavy, producing localized stress raisers, and thereby seriously compromising fatigue behavior. In short, it is believed that Grosh would be subjected to fatigue at this region of joinder and thereby fail at this region of joinder.

The insert 10 used by Grosh in the region of joinder of the two shell sections provides a thick heavy wall to the vessel. However, and while this provides some degree of structural integrity, it is not capable of producing any efficient load transfer. To suggest that the U-shaped groove of Grosh would be equivalent to a simple joint really stretches credulity. In the case of the instant application, the applicant provides a thin load carrying inner shell joined with efficient tapered bonded joint design. As a result, the design approach used in Grosh et al. and the design approach used in the instant application are entirely different. The position of the Examiner would be equivalent to saying that a riveted joint is the same a welded joint since they behave in similar manners.

Finally, it is to be noted that stiffness variations exist throughout the Grosh et al. design and do not allow for an efficient

low weight pressure vessel to be achieved. The present invention provides that design with very low parasitic (non load carrying) weight.

When examining Claim 1, it can be noted that this claim clearly calls for the joinder ring fitted within the shell sections and which is bonded to tapered bonding regions in each of the shell sections. It is obvious that Grosh et al. provide no answering structure. The same holds true in Claims 12-16, which have been amended to include those limitations of Claims 1-11.

The applicant has also examined each of the other prior art references cited by the Examiner and believes that these references are not any more relevant than the Grosh patent. Therefore, favorable reconsideration and allowance of the present application is respectfully solicited.

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Respectfully submitted,

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